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Acculturation and the Lifetime Risk of Psychiatric and Substance Use Disorders among Hispanics

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Between 1981 and 1995, approximately 5 million people from either Mexico, Cuba, Central America, or South America immigrated to the United States. Some regional studies have suggested that as Hispanic immigrants become acculturated to American society, their risk of mental illness increases sharply. This study examined the lifetime risk of psychiatric and substance use disorders among U.S. Hispanic subgroups and the specific role of nativity, parental nativity, language preferences, and other sociodemographic characteristics as risk factors for these disorders. The study used the National Comorbidity Survey (NCS), a national probability sample of 8098 U.S. adults aged 15 to 54. Selected DSM-III-R psychiatric diagnoses were collapsed into eight categories. When compared with non-Hispanic whites, Mexican-Americans were less likely to have any psychiatric disorder. After multivariate adjustment, acculturation items predicted greater risk of having any DSM-III-R disorders for Mexican-Americans and "other" Hispanics and greater risk of having a substance abuse disorder for Puerto Ricans, among other significant relationships. The results suggest that there is likely to be an increasing prevalence of psychiatric and substance use disorders among Hispanics that may be attributable to increasing levels of acculturation among the more than 5 million recent immigrants from Latin America.

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Exploring the relationship between Hispanic ethnicity and psychiatric disorders is increasingly important, as Hispanics are rapidly becoming the largest minority group in the United States (Holmes, 1998; Keefe and Padilla, 1992). Between 1981 and 1995, approximately 5 million people from either Mexico, Cuba, Central America, or South America immigrated to the United States (U.S. Bureau of the Census, 1997). Further, epidemiological studies of psychiatric and substance use disorders among Hispanics have been, for the most part, lacking in depth and comprehensiveness (Guarnaccia et al., 1990). Many studies that have examined the associations between Hispanic ethnicity and the risk of psychiatric and substance use disorders have not included data on important determinants such as social stressors and acculturation. Further, most studies do not differentiate or compare Hispanic subgroups, despite their potentially different life experiences and risks of psychiatric illness (Guarnaccia et al., 1990).

Studies that have examined the role of acculturation in predicting mental health disorders have shown somewhat inconsistent results: acculturation has been observed to relate linearly (both positively and negatively) to psychological distress. For example, in a household sample of Mexican-Americans in Los Angeles, Burnam et al. (1987) found that highly acculturated U.S.-born subjects had higher lifetime prevalence scores of major depression, phobia, and dysthymia and higher prevalence of drug and alcohol abuse/dependence than Mexican-born subjects. On the other hand, in a patient-based sample, Fabrega and Wallace (1970) found that less acculturated Mexican-Americans had more psychiatric impairment; however, they did not use a community sample and the study was conducted 30 years ago. Studying a community sample of Vietnam veterans, Ortega and Rosenheck (2000) found no relationship between level of acculturation and posttraumatic stress disorder among Hispanic Vietnam veterans. A recent study from the central valley of California re-

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ported that Mexican-Americans had strikingly lower lifetime rates of psychiatric illness compared with the general population, and it was specifically recent immigrants who had lower lifetime rates of psychiatric illness while immigrants who had been in the United States more than 13 years had higher rates, which approximated those of the general U.S. population (Vega et al., 1998). The reasons for these inconsistent results are unclear and could be attributable to differences in premorbid risk factors, differences in acculturative strain, or culture-based experiences, values, or beliefs (Levine, 1973; Vega et al., 1997).

Three major epidemiological studies have examined the associations between either substance use or psychiatric disorders and Hispanic ethnicity: the Hispanic Health and Nutrition Survey (HHANES), the National Household Survey on Drug Abuse (NHSDA), and the Epidemiology Catchment Area Study (ECA; Eaton et al., 1991; National Institute on Drug Abuse, 1987; Substance Abuse and Mental Health Services Administration, 1998). The HHANES was a national epidemiological study of Hispanics ages 12 to 74 administered from 1982 to 1984. The HHANES found that rates of substance use differ across Hispanic subgroups. In particular, the largest Hispanic subgroups, Puerto Ricans and Mexican-Americans, were both more likely to have past or present drug use, 43% and 42% respectively, than Cuban-Americans (20%), and it was reported that acculturation increased the risk of substance use (Amaro et al., 1990). The Substance Abuse and Mental Health Services Administration (SAMHSA) used the NHSDA to measure the associations between substance use, race, and ethnicity, and found that Puerto Ricans and Mexicans had higher prevalences of illicit drug use (including marijuana and cocaine) than Hispanics of other Latin nationalities. On the other hand, the ECA, a multisite study of psychiatric disorders, did not find ethnic differences in rates of current or lifetime affective disorders (Eaton et al., 1991; Weissman et al, 1991).

This study examines the lifetime prevalence of mental illness and substance abuse among Hispanic people living in the United States, using data on lifetime prevalence of DSM-III-R psychiatric disorders from the National Comorbidity Survey (NCS), a national epidemiological study of both nonsubstance psychiatric disorders and substance use disorders. In a previous study using the NCS data, Kessler et al. (1994) found higher prevalences of current affective disorders and comorbidity among Hispanics compared with non-Hispanic whites but reported no additional differences. In that report, however, rates of mental illness among the subgroups in the Hispanic population were not examined (Hispanics were grouped together), nor was the role of acculturation considered.

The NCS is the largest available nationally representative study of comorbid psychiatric and substance use disorders that includes different major subgroups of English-speaking Latinos, particularly Puerto Ricans and Mexican-Americans, and some acculturation indicators. Although the NCS was not specifically designed to test the relationship of acculturation and mental health among Latinos, it can be used to test central hypotheses about this relationship by using standard acculturation indicators such as nativity, parental nativity, and language preferences. The NCS thus provides a unique opportunity to test propositions about mental illness and acculturation indicators, which may provide insight for future studies.

In this paper, we seek to determine: a) whether there are differences in lifetime DSM-III-R disorder types between whites and each of the major Hispanic ethnic subgroups; and b) whether acculturation indicators such as nativity, parental nativity, and language preferences independently increase the risk of DSM-III-R disorders and comorbidity among Hispanic subgroups.

Methods

The methods used in collecting data for the NCS have been fully described in previously published work (Kessler et al., 1994). The NCS is a stratified, multistage area probability sample of people ages 15 to 54 years in the noninstitutionalized civilian population in the 48 coterminous states. A total of 8098 subjects responded (83%). A nonresponse survey determined that there were higher rates of psychiatric disorders among nonrespondents; therefore, a nonresponse adjustment weight was constructed. A second weight was constructed to account for variation in probabilities of selection both within and between households. A third weight was constructed to adjust the data to approximate the national population distributions of the cross-classification of age, sex, race/ethnicity, marital status, education, living arrangements, region, and urbanicity as defined by the 1989 U.S. National Health Interview Survey (NHIS; U.S. Department of Health and Human Services, 1992). Results using weighted NCS data are presented. Spanish-speaking interviewers were not available, and therefore results are limited to English-speaking Hispanics; only having English-speaking subjects provides the study with a conservative test of the association between the acculturation items and psychiatric illness.

Race and Ethnicity

Race and ethnicity were categorized based on respondent self-reports. Two questions were asked regarding race and ethnicity. The first question asked for the respondent to indicate if he or she was of Hispanic ethnicity. If the answer was yes, then the respondent indicated his or her nationality (Mexican, Mexican-American, Chicano, Puerto Rican, Cuban, and other Spanish). The second asked about race (white, black, American-Indian, Asian, other). For the purposes of this paper, five categories of race/ethnicity were constructed (weighted frequencies): non-Hispanic white (N = 6,098); non-Hispanic black (N = 930); Mexican-American (includes all those who answered affirmatively to Mexican, Mexican-American, or Chicano; N = 484); Puerto Rican (N = 86); "other" Hispanic (including Cubans and those who indicated yes to other Spanish; N = 149); and other race or ethnicity (N = 286). Sixty-eight respondents had unclassified race/ethnicity.

Psychiatric Measures

Lifetime prevalence is the proportion of the sample who ever experienced a psychiatric or substance abuse disorder. Diagnoses are based on DSM-III-R criteria (American Psychiatric Association, 1987). The diagnostic interview used to obtain the diagnoses is a version of the Composite International Diagnostic Interview (CIDI), which was designed to be used by nonclinicians (World Health Organization, 1990). A more complete description of the assessment process is available from a previously published report (Kessler et al., 1994).

The DSM-III-R diagnoses included in this study are major depression, dysthymia, panic disorder, agoraphobia, social phobia, simple phobia, generalized anxiety disorder, alcohol abuse, alcohol dependence, drug abuse, drug dependence, posttraumatic stress disorder (PTSD), and antisocial personality disorder. In previous analyses of the NCS data, 79% of people with mental disorders were found to have more than one disorder present (Kessler et al., 1994). Diagnostic conditions were collapsed into the following eight categories: any disorder, ≥ 3 disorders, comorbid psychiatric and substance use disorder, any affective disorder, any anxiety disorder, any substance use disorder, PTSD, and antisocial personality.

Analysis

Standard errors of parameter estimates based on conventional estimation procedures are biased in the NCS. Because the sample design selected clusters of households, it tended to induce a within cluster correlation that could increase the standard errors of the regression coefficient estimation. Adjustments for the design effect were incorporated into the estimation process by the Taylor series linearization method implemented in SUDDAN (Shah et al., 1991).

Multiple logistic regression models were used to obtain odds ratios and 95% confidence limits measuring the associations between the race/ethnicity variables and the psychiatric measures adjusting for education, age, and income. Eight dichotomous dependent variables were used: any disorder (*i.e.*, one or more psychiatric or substance use disorder; N = 4035, 50%); ≥ 3 disorders (N = 575, 10%); comorbid psychiatric and substance use disorder (N = 1,250, 15%), any affective disorder (N = 1638, 20%), any anxiety disorder (N = 1991, 25%), any substance use disorder (N = 2,250, 28%), PTSD (N = 591, 7%), and antisocial personality (N = 261, 3%).

Acculturation is a multidimensional concept reflecting complex processes of adaptation to an alien society and culture. Methods of assessing acculturation have varied across studies, but most studies rely on measures such as preferences for spoken and written language, diet, personal assessment of nationality, and personal and parental nativity (Burnam et al., 1987; Ortega and Rosenheck, 2000; Richardson et al., 1987; Rogler et al., 1991; Solis et al., 1990; Vega et al., 1998). In this paper, we examine acculturation as indicated by four separate dichotomous indicators (coding): nativity (1 = U.S.-born, 2 = Immigrant); parental nativity (1 = at least 1 parent born in the U.S., 2 = neither parent born in the U.S.); language as a child (1 = English, 2 = Not English); and current language at home (1 = English, 2 = Not English). Chi-square analyses were used to determine the differences in the acculturation indicators and sociodemographic characteristics across ethnic subgroups.

A set of multivariate analyses examined the effects of the acculturation items on five of the diagnostic categories (any disorder, ≥ 3 disorders, psychiatric and substance use disorder, any substance use disorder, and PTSD) stratified by the subgroups. The models assessed the effect of each acculturation item after adjusting for the other acculturation items. This strategy was used because acculturation items may be associated with each other, and it is analytically important to determine whether the acculturation items have different independent effects on the diagnostic categories. A final set of multivariate analyses tested for interaction of the four acculturation items and education using the subset of all Hispanics and also the strata-specific subgroups.

The interaction models used any disorder, ≥ 3 disorders, and comorbid psychiatric and substance use disorder as the dependent variables.

Results

The NCS sample has been described elsewhere (Kessler et al., 1994). Of the 8098 respondents, 76% were non-Hispanic white, 12% were non-Hispanic black, 6% were Mexican-American, 1% were Puerto Rican, 2% were of another Hispanic nationality, and 4% were classified as "other" race or ethnicity. Fifty percent were male, 86% were married, and 54% had more than a high school education or equivalent.

Race and Ethnicity and Psychiatric Illness

Associations of race and ethnicity and lifetime psychiatric illness were all adjusted for age, income, and education (Table 1). Mexican-Americans were less likely than whites to have any disorder, ≥ 3 disorders, and both a psychiatric and substance use disorder (Table 1). They were also less likely to have any anxiety disorder and any substance use disorder (Table 2). No significant findings were found for Puerto Ricans or other Hispanics (Table 2).

TABLE 1
Adjusted Effects of Race/Ethnicity on Any Lifetime UM-CIDI/DSM-III-R Disorder and Comorbidities, Logistic Regression[a]

	Any Disorder	≥ 3 Disorders	Psychiatric and Substance Use Disorder
White, non-Hispanic (N = 6098)	1.0	1.0	1.0
Mexican-American (N = 484)	0.7 (0.5, 0.9)	0.5 (0.3, 0.8)	0.07 (0.04, 0.1)
Puerto Rican (N = 86)	0.7 (0.3, 1.4)	0.3 (0.1, 1.4)	0.5 (0.3, 1.1)
"Other" Hispanic (N = 149)	0.9 (0.5, 1.4)	0.9 (0.3, 3.0)	0.8 (0.5, 1.3)
Black, non-Hispanic (N = 930)	0.5 (0.4, 0.6)	0.6 (0.4, 1.0)	0.4 (0.3, 0.6)

[a]Adjusted for age, income, and education. Odds Ratios (OR), 95% confidence intervals. The referent category is white, non-Hispanic (OR = 1.0).

When examining the three Hispanic subgroups on selected demographic and acculturation items, we found significant differences by urbanicity, education, nativity, parental nativity, and current language at home. Forty-five percent of Mexican-Americans compared with 80% of Puerto Ricans and 21% of other Hispanics lived in a major metropolitan area. No Puerto Ricans lived in a rural area while 8% of Mexican-Americans and 73% of other Hispanics lived in rural areas. Forty-three percent of both Mexican-Americans and Puerto Ricans had less than a high school education or equivalent compared with only 19% of other Hispanics. Twenty-four percent of Mexican-Americans and 23% of Puerto Ricans had at least 16 years of a college education compared with 38% other Hispanics (Table 3).

Eighty-five percent of Mexican-Americans and 78% of Puerto Ricans compared with 64% of other Hispanics were foreign- or island-born. Seventy-seven percent of Mexican-Americans compared with 38% of Puerto Ricans and 46% of other Hispanics had at least one parent who was born in the U.S. mainland. Eighty-two percent of Mexican-Americans and 81% of Puerto Ricans compared with 62% of other Hispanics currently speak English as the first language at home. There were no significant differences in the following characteristics: sex, age, marital status, and language spoken at home as a child (64% of Mexican-Americans, 71% of Puerto Ricans, and 69% of other Hispanics spoke English at home as a child; Table 3).

Acculturation Factors and Psychiatric Illness

When examining the associations of the acculturation indicators and psychiatric comorbidity stratified by the three Hispanic subgroups, several significant associations were found (Table 4).

Mexican-Americans. In multivariate analyses of Mexican-Americans that included all four acculturation items, education, age, and income, significant differences were found for U.S.-born versus foreign-born subjects when predicting any disorder (OR = 3.8, 95% CI: 1.8, 7.9) and PTSD (OR = 10.8, 95% CI:

TABLE 2
Adjusted Effects of Race/Ethnicity on Lifetime UM-CIDI/DSM-III-R Disorder Types, Logistic Regression[a]

	Any Affective Disorder	Any Anxiety Disorder	Any Substance Use Disorder	PTSD	Antisocial Personality
White, non-Hispanic (N = 6098)	1.0	1.0	1.0	1.0	1.0
Mexican-American (N = 484)	0.8 (0.6, 1.2)	0.7 (0.5, 0.9)	0.6 (0.4, 0.8)	1.5 (0.9, 2.7)	0.8 (0.5, 1.4)
Puerto Rican (N = 86)	0.9 (0.5, 1.7)	0.8 (0.4, 1.3)	0.8 (0.4, 1.8)	0.9 (0.2, 3.1)	0.2 (0.02, 1.2)
"Other" Hispanic (N = 149)	1.3 (0.8, 2.2)	1.0 (0.6, 1.7)	0.7 (0.4, 1.3)	0.8 (0.4, 1.4)	1.2 (0.4, 4.2)
Black, non-Hispanic (N = 930)	0.6 (0.5, 0.8)	0.8 (0.6, 1.0)	0.3 (0.2, 0.4)	1.1 (0.7, 1.6)	0.8 (0.5, 1.4)

[a]Adjusted for age, income, and education. Odds Ratios (OR), 95% confidence intervals. The referent category is white, non-Hispanic (OR = 1.0).

TABLE 3
Hispanic Subgroups by Subject Demographics and Acculturation Factors

	Mexican-American (N = 484)	Puerto Rican (N = 86)	"Other" Hispanic (N = 149)	χ^2P
Demographics				
Urbanicity				
Rural	38 (8%)	0 (%)	108 (73%)	.001
Major Metropolitan	218 (45%)	70 (80%)	32 (21%)	
Other Urban	229 (47%)	17 (20%)	9 (6%)	
Sex				
Male	242 (50%)	45 (52%)	73 (49%)	.90
Female	242 (50%)	41 (48%)	76 (51%)	
Age (yr)				
15–24	203 (42%)	33 (37%)	51 (34%)	.33
25–34	140 (29%)	25 (29%)	53 (35%)	
35–44	103 (21%)	18 (20%)	31 (21%)	
45–54	39 (8%)	13 (14%)	15 (10%)	
Education				
0–11	207 (43%)	38 (43%)	28 (19%)	.001
12 (or equivalent)	123 (25%)	20 (23%)	44 (29%)	
13–15	39 (8%)	10 (11%)	23 (15%)	
≥ 16	116 (24%)	19 (23%)	56 (38%)	
Marital status				
Married/cohabitation	266 (85%)	44 (92%)	74 (82%)	.35
Separated/widowed/divorced	46 (15%)	4 (8%)	16 (18%)	
Acculturation factors				
Nativity				
Foreign- or island-born	319 (85%)	54 (78%)	68 (64%)	.001
U.S. mainland-born	58 (15%)	16 (22%)	38 (36%)	
At least 1 parent born in the U.S. mainland				
No	291 (77%)	26 (38%)	49 (46%)	.001
Yes	87 (23%)	42 (62%)	56 (54%)	
Language at home as a child				
Not English	134 (36%)	21 (29%)	34 (31%)	.46
English	242 (64%)	50 (71%)	73 (69%)	
Current language at home				
Not English	45 (18%)	10 (19%)	28 (38%)	.002
English	197 (82%)	40 (81%)	46 (62%)	

2.3, 50.9). Those who had at least one parent born in the United States were more likely to have any substance use disorder than those who did not have at least one parent born in the United States (OR = 2.3, 95% CI: 1.0, 5.1), and those who spoke English as a first language at home as a child were more likely to have ≥ 3 disorders than those who did not speak English (OR = 3.0, 95% CI: 1.0, 9.6; Table 4).

Puerto Ricans. The only significant association found among Puerto Ricans was that those who currently speak English at home were more likely than others to have a substance use disorder (OR = 97.4, 95% CI: 2.1, 999; Table 4).

Other Hispanics. U.S.-born "other" Hispanic subjects were more likely to have any disorder (OR = 6.7, 95% CI: 2.0, 22.2) and any substance use disorder (OR = 5.8, 95% CI: 1.5, 22.8). Those whose current language at home is English were more likely to have any disorder (OR = 6.6, 95% CI: 2.2, 19.9), ≥ 3 disorders (OR = 196.2, 95% CI: 1.6, 999), and any substance use disorder (OR = 3.9, 95% CI: 1.0, 14.3; Table 4).

Nonadditive Models

A series of multiplicative models were constructed to determine whether, among all Hispanics and within each of the Hispanic subgroups, there was a significant interaction between education and the acculturation items in predicting mental illness. None of the models revealed significant interactions, indicating that, in the NCS sample, the associations between the acculturation items and comorbid mental health diagnoses are not dependent on education.

Discussion

The notion that acculturation impacts one's risk for psychiatric disorders is not a new one. An important reanalysis of Jarvis' (1855) data on social

TABLE 4
Multivariate Logistic Regression Models of Selected Lifetime UM-CIDI/DSM-III-R Disorder Types among Hispanic Subgroups by Acculturation Items[a]

	Any Disorder	≥ 3 Disorders	Psychiatric and Substance Use Disorder	Any Substance Use Disorder	PTSD
Mexican-American (N = 484)					
Nativity					
Foreign-born	1.0	1.0	1.0	1.0	1.0
U.S.-born	3.8 (1.8, 7.9)	1.2 (0.2, 6.6)	3.0 (0.9, 10.0)	2.1 (0.8, 5.4)	10.8 (2.3, 50.9)
At least 1 parent born in US					
No	1.0	1.0	1.0	1.0	1.0
Yes	1.5 (0.8, 2.9)	0.6 (0.2, 2.1)	1.4 (0.5, 3.5)	2.3 (1.0, 5.1)	0.9 (0.4, 2.3)
Language at home as a child					
Not English	1.0	1.0	1.0	1.0	1.0
English	0.6 (0.4, 1.1)	3.0 (1.0, 9.6)	1.4 (0.7, 2.7)	1.5 (0.9, 2.6)	0.9 (0.5, 1.9)
Current language at home					
Not English	1.0	1.0	1.0	1.0	1.0
English	1.8 (0.8, 4.3)	1.0 (0.2, 5.4)	2.2 (0.9, 5.8)	0.8 (0.2, 2.6)	1.6 (0.7, 3.7)
Puerto Ricans (N = 86)					
Nativity					
Foreign- or island-born	1.0	1.0	1.0	1.0	1.0
U.S. mainland-born	3.0 (0.4, 21.2)	1.2 (0.2, 6.6)	0.6 (0.1, 8.4)	1.3 (0.2, 10.6)	Zero cells[b]
At least 1 parent born in the U.S. mainland					
No	1.0	1.0	1.0	1.0	1.0
Yes	0.2 (0.0, 1.2)	Zero cells[b]	0.9 (0.0, 36.2)	0.1 (0.0, 0.8)	2.3 (0.1, 68.9)
Language at home as a child					
Not English	1.0	1.0	1.0	1.0	1.0
English	2.5 (0.3, 18.3)	Zero cells[b]	0.6 (0.0, 19.1)	3.0 (0.3, 34.9)	0.2 (0.0, 7.9)
Current language at home					
Not English	1.0	1.0	1.0	1.0	1.0
English	11.6 (0.3, 407.7)	Zero cells[b]	0.4 (0.0, 28.5)	97.4 (2.1, 999)	Zero cells[b]
Other Hispanics (N = 149)					
Nativity					
Foreign-born	1.0	1.0	1.0	1.0	1.0
U.S.-born	6.7 (2.0, 22.2)	54.5 (0.4, 999)	3.0 (0.9, 10.0)	5.8 (1.5, 22.8)	0.2 (0.0, 14.2)
At least 1 parent born in U.S.					
No	1.0	1.0	1.0	1.0	1.0
Yes	0.9 (0.2, 3.9)	0.8 (0.0, 28.6)	1.0 (0.1, 8.3)	1.7 (0.3, 8.3)	0.5 (0.0, 41.5)
Language at home as a child					
Not English	1.0	1.0	1.0	1.0	1.0
English	1.3 (0.3, 4.8)	2.1 (0.1, 45.4)	4.1 (0.9, 18.8)	1.9 (0.5, 6.8)	140.7 (1.1, 999)
Current language at home					
Not English	1.0	1.0	1.0	1.0	1.0
English	6.6 (2.2, 19.9)	196.2 (1.6, 999)	0.3 (0.0, 2.8)	3.9 (1.0, 14.3)	5.5 (0.2, 186.4)

[a]Adjusted for acculturation items, age, income, and education. Odds ratios (OR), 95% confidence intervals. The referent category is the first category (OR = 1.0).

[b]Zero cells, unable to compute odds ratio.

class and nativity recently showed that the prevalence of mental illness was significantly lower among foreign-born Irish people than U.S.-born (Vander Stoep and Link, 1998). The current study shows in a nationally representative sample that acculturated Hispanics of different nationalities are at increased risk for both psychiatric and substance use disorders than their less acculturated counterparts. The study also highlights the importance of stratifying Hispanics by ethnic subgroups, as their risk for poor mental health outcomes may differ considerably. In particular, the effects of acculturation on psychiatric illness may be different across the subgroups. Future studies of acculturation and mental health among Hispanics should take into account the variability between groups and acculturation stress.

This study supports and extends the recent work of Vega et al. (1998), which found that in the central valley of California more acculturated Mexicans have a higher risk of lifetime DSM-III-R psychiatric disorders than recent Mexican immigrants. The central contribution of this study is that the association between lifetime DSM-III-R psychiatric disorders

and acculturation seems to be generalizable in a national sample of Hispanics and not just to those in one area or region.

Few significant associations were found for Puerto Ricans. The reason for insignificant findings in this group is either that the relationship of acculturation and mental illness is different among Puerto Ricans than it is among other Hispanic ethnic groups or there is a lack of statistical power associated with the small sample size. The wide confidence intervals reported for the Puerto Rican estimates in this study suggest that low statistical power is the more likely reason for the lack of association in this data set.

We examined the differences in risk for the disorder types by language at home as a child and by current language. Increased risk for some disorder types was found: currently speaking English at home had significant and substantial risk for some disorder types, whereas speaking English at home as a child did not. For instance, Table 4 shows that among Puerto Ricans the adjusted risk for having any substance use disorder is substantial and significantly greater in association with current use of English at home but not for using English as a child. Similarly, among other Hispanics the risks for having any disorder, ≥ 3 disorders, and any substance use disorder are substantial and significant for current language, whereas they were not significant for language as a child. These findings suggest that as Hispanics assimilate to American culture their risks for some mental disorders increase in relation to language preferences, which supports the notion that acculturation has an effect on mental health. In general, attenuation of one's ethnic culture through being born in the U.S. mainland or through not currently speaking Spanish at home appear to be associated with increased risk for psychiatric illness and comorbidity.

The pathways or mechanisms that lead acculturated Hispanics to high risk of psychiatric and substance use disorders need further exploration. Possible mechanisms through which acculturation may affect PTSD have been described by Escobar et al. (1983), who reported on a sample of Mexican Vietnam veterans in East Los Angeles. Escobar et al. theorized that acculturation could work through "shifts" such as language, cognitive style, personality characteristics, and identity (Escobar et al., 1983). In addition to factors that were specific to Vietnam veterans, such as combat exposure, Escobar et al. theorized that "level of acculturation . . . may have had negative consequences because it may have led to an erosion of traditional family networks." The apparent adverse effect of acculturation on mental health contradicts the current immigration stress paradigm, which suggests that immigration has negative effects as a result of increasing stress and social disadvantage. Escobar argues that "the real reason for the advantages that [Hispanic] immigrants have may be due to a "protective" or "buffering" effect of traditional culture" (Escobar, 1998, p. 782). In other words, the breakdown of the family network contributes to an increasing risk of poor mental health outcomes. Clear and definitive mechanisms, however, have yet to be identified (Cheng and Chang, 1999). The pathways of acculturation that lead to poor mental health thus deserve extensive additional empirical investigation.

Limitations

Several limitations of this study need to be acknowledged. First, the NCS is a cross-sectional survey, making the temporal sequence of acculturation and subsequent onset of mental illness ambiguous, particularly because acculturation is a time-dependent concept. Second, the NCS was not designed to test the hypothesis that acculturation is associated with mental health, and therefore only limited data are available on that central construct. Third, sample sizes for some Hispanic subgroups are small, thus limiting statistical power. Fourth, the NCS uses the CIDI as a diagnostic instrument, which may inaccurately measure the rate of somatization among Latinos (Villasenor and Waitzkin, 1999). Fifth, Spanish-speaking interviewers were not used in the NCS, and therefore the segment of less acculturated Latinos or Latinos who only speak Spanish is likely to be underrepresented. Our findings might have been more robust with the additional sample of subjects who only speak Spanish. Sixth, we used items of the acculturation construct opposed to an aggregate measure. This approach, however, allowed us to determine the effects of the individual items and to assess the temporal effects of language use.

Conclusions

This study supports in a national sample the previous observation that even when adjusted for age, income, and education, nativity, parental nativity, and language preferences are independent risk predictors of psychiatric and substance use disorders among diverse subgroups of Hispanics. As a result, there is likely to be an increasing prevalence of psychiatric and substance use disorders among Hispanics that will be attributable to increasing levels of acculturation among the more than five million re-

cent immigrants from Latin America. The mechanisms that explain why acculturation affects the risk of having a mental health disorder deserve further attention, especially as increasing numbers of people of different Latin nationalities continue to immigrate to the United States.

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